

# **UNIVERSITY CAMPUS NETWORKING**

## **A PROJECT REPORT**

*Submitted by*

**HARSH JOLAPARA-92000133024**

*In partial fulfillment for MPC (01CT0716) Project*

**Sem – 7<sup>th</sup>**

**Degree ENGINEERING**

*in*

**Information and Communication Technology Engineering**



**Faculty of Technology Studies**

**Marwadi University, Rajkot**

**Description:**

A university campus networking project in cisco packet tracer, the project has campus network with floors and classes and from that one class as example given. First we need to assume that university have server that runs https server and also this server connected with router that is outside of university and one Wi-Fi main campus router that is connected. Each cable pc connected with server through the switches and LAN cables and other devices are connected with Wi-Fi and after connecting user need to run the website and need to enter the id and password and assume that there is database for id and password and also assume that network will be given after the login.

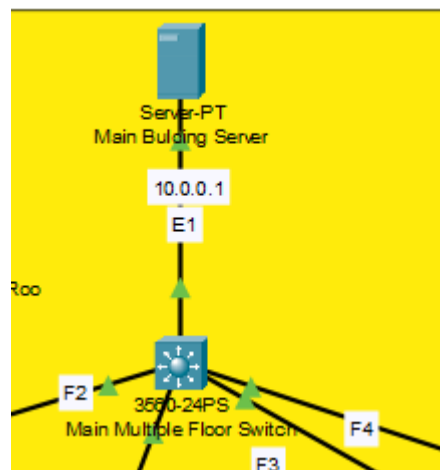
Class has an IOT systems also like automatic ac based on temperature, webcam based on the motions, Bluetooth mp3 player and lights, fan and pcs.

Campus have lawn sprinkler also that will work based on the humidity of grass and also RFID card based door system, fire sprinkler system and garage door based on RFID and all things will be connected to the IOT server.

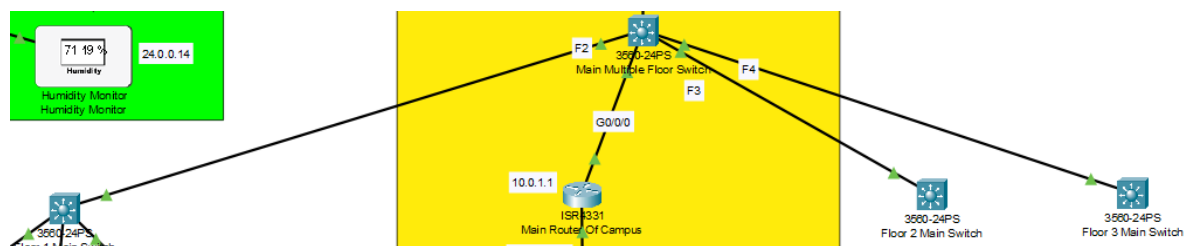
## Project Overview:

Main server of campus will be connected to multiple switch that switch will be connected to all the floors switches and that all switches are connected to the each class switches.

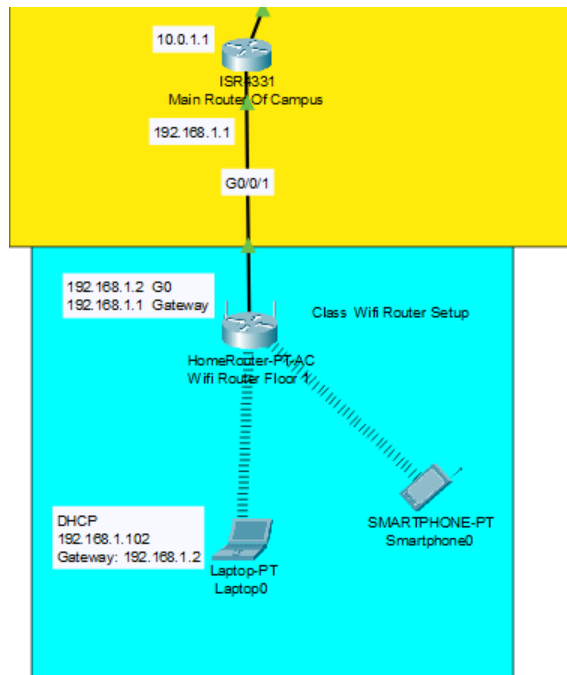
Main server assigned ip address of 10.0.0.1 in Ethernet1(E1) cable that is connected to main multiple switches.



The main multiple switch will be connected to the floor switches with the different lan cables and also will be connected to one main router of the campus for network.



The main router will be connected to different floors wifi routers and the different devices will be connected to the wifi router. All connecting devices will be based on the DHCP(dynamic host configuration protocol) that will assign new device ip address automatically.



Wireless0	
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	300 Mbps
MAC Address	0001.643B.749E
SSID	Default
<b>Authentication</b> <input checked="" type="radio"/> Disabled <input type="radio"/> WEP      WEP Key: <input type="text"/> <input type="radio"/> WPA-PSK <input type="radio"/> WPA2-PSK      PSK Pass Phrase: <input type="text"/> <input type="radio"/> WPA <input type="radio"/> WPA2      User ID: <input type="text"/> <input type="radio"/> 802.1X      Method: <input type="text"/> MD5      Password: <input type="text"/> <input type="text"/> User Name: <input type="text"/> <input type="text"/> Password: <input type="text"/>	
Encryption Type	Disabled
<b>IP Configuration</b> <input checked="" type="radio"/> DHCP <input type="radio"/> Static IPv4 Address: 192.168.1.101 Subnet Mask: 255.255.255.0	

The all floor wifi will be have the gateway of main router that all wifi connected devices can access the main server websites and also will able to ping the server.

```

C:\>ping 10.0.0.1

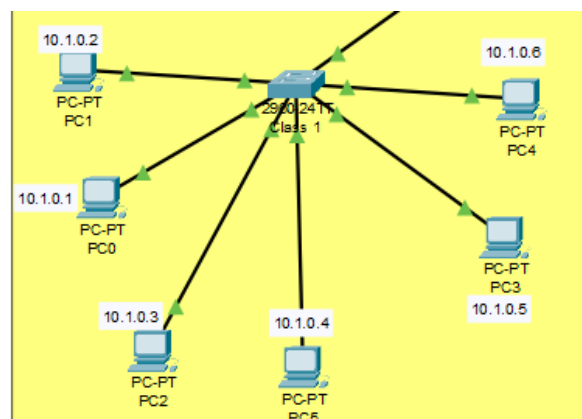
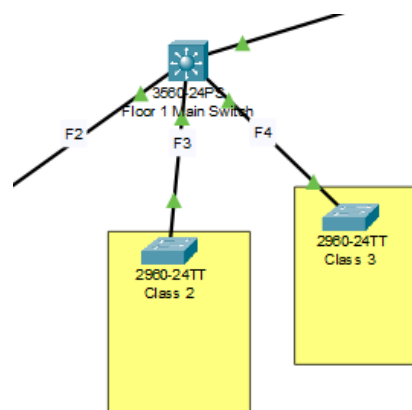
Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=19ms TTL=127
Reply from 10.0.0.1: bytes=32 time=17ms TTL=127
Reply from 10.0.0.1: bytes=32 time=16ms TTL=127
Reply from 10.0.0.1: bytes=32 time=8ms TTL=127

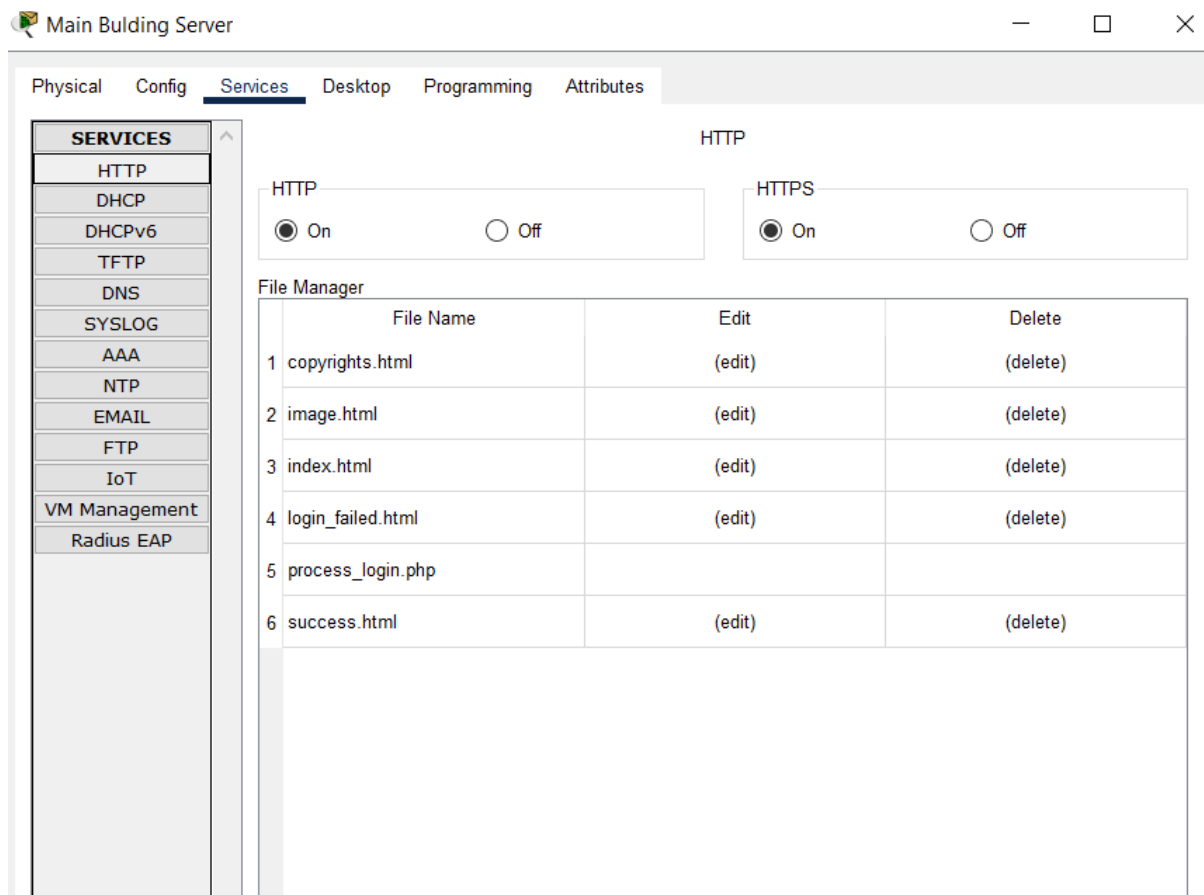
Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 19ms, Average = 15ms

```

For each class there will be pc that are connected with the switch of that class via LAN Ethernet and that pc will be given ip address and that pc will be also able to ping the main server and can access the main server website.

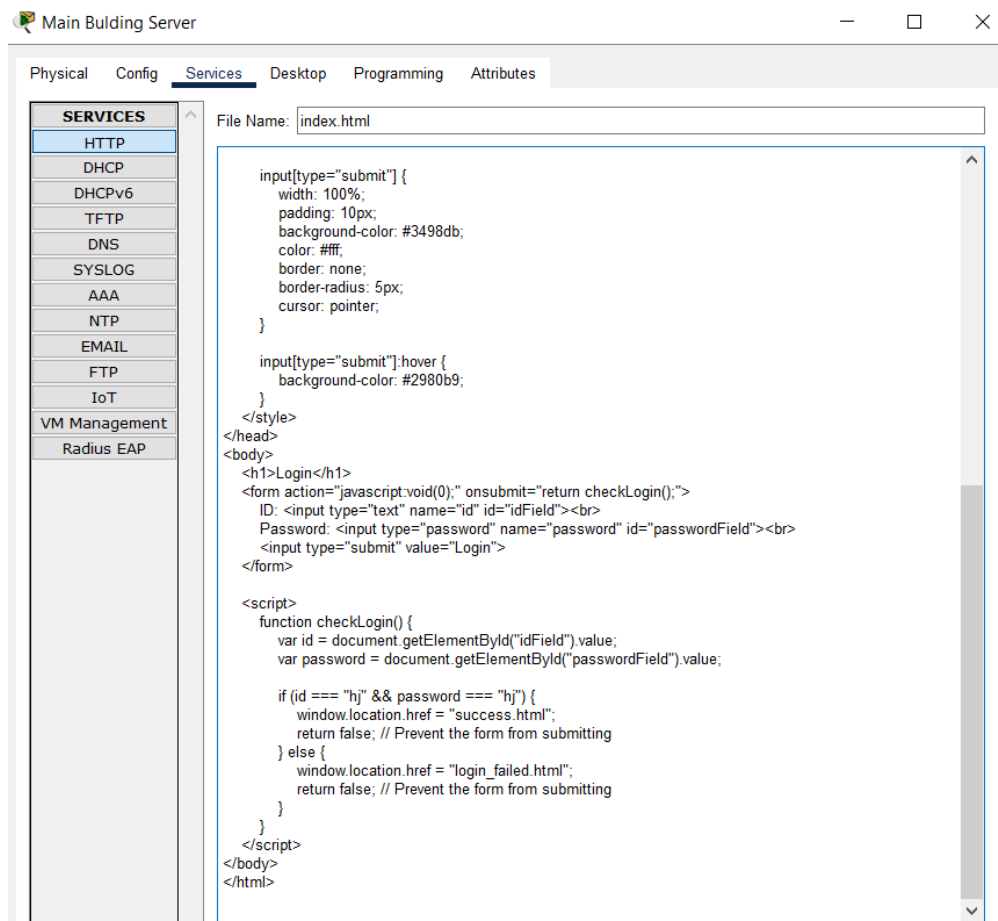


Then I have started http and https service in server so all other devices can access the website and we also will be add the out manually webpages.

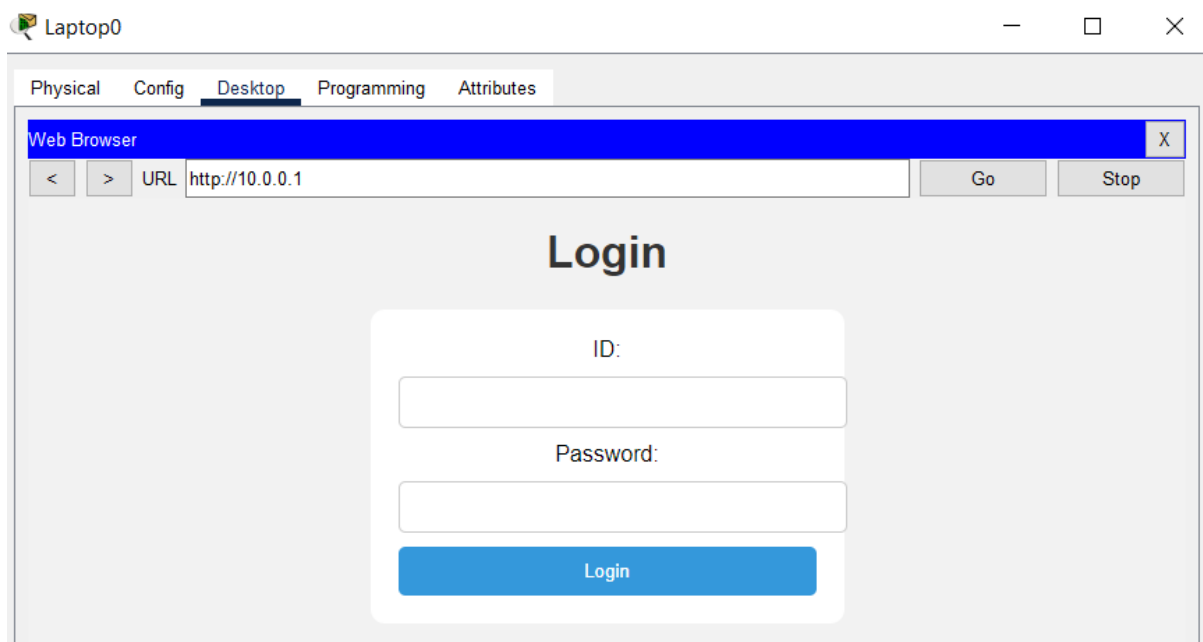


Here index.html and success.html and login\_failed.html are manually added and assume that real server will be have database of users for login.

We will be add manually login system here and also add code of html for webpage.

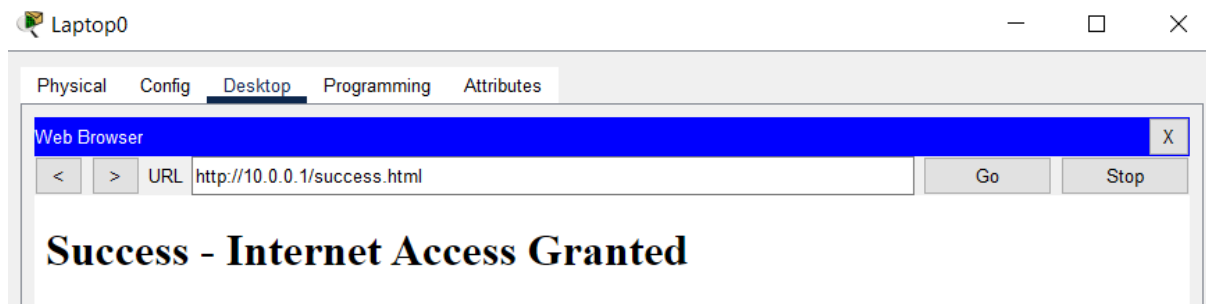


Now when we start web browser in connected pc via wifi or lan then able to access the website using entering server ip address 10.0.0.1.



Now just we need to assume that if password and username is correct then success means network will be provided otherwise not.

For success:



For failure:

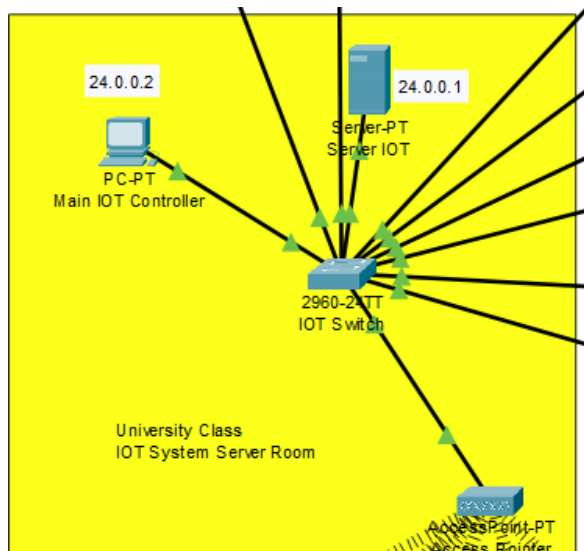


---

Now we will make an IOT server and will be use IOT devices for each class and university campus.

First we add server and then we will be start IOT server inside that and also will be connect to the pc for access that server.



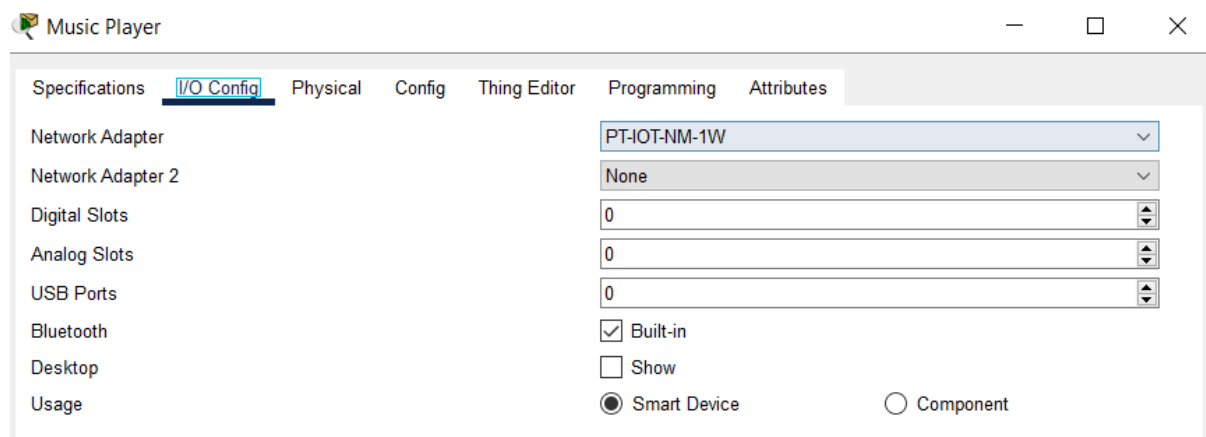


Then will connect the switch to that main IOT server and all the devices will be connect to that switch.

For connecting the devices to the IOT server we need to add the configurations with remote server.

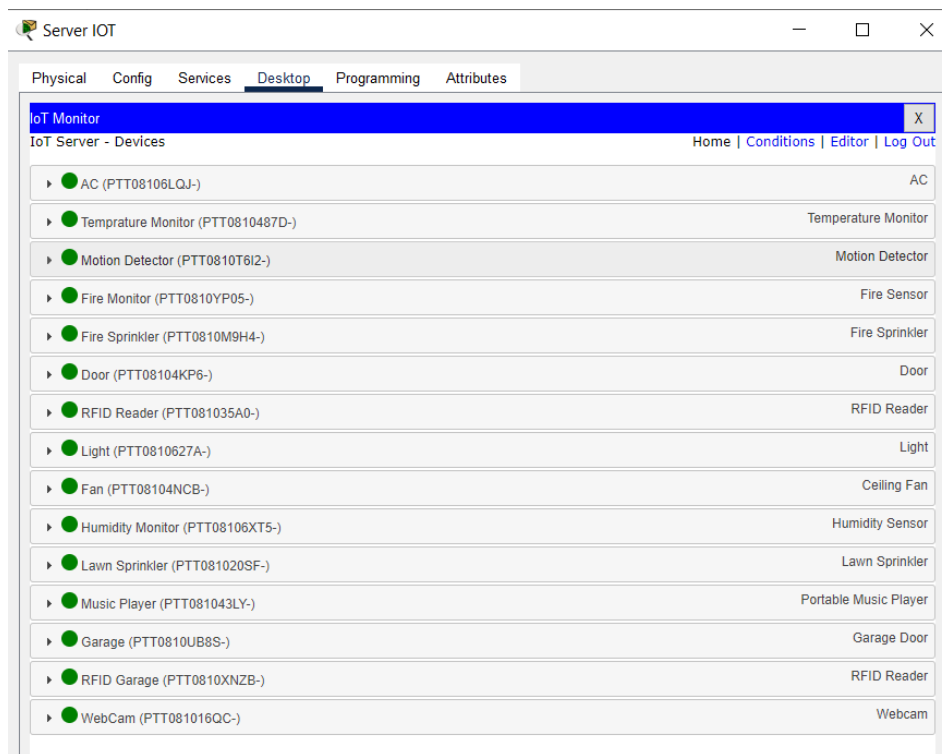
First we will sign up inside IOT server with name and password **harsh**.

If IOT devices not showing cables or remote server option then we can config that IOT device in advanced option.



Here we will be change network adaptor to wifi type for wireless and for other Ethernet we can select a different.

After connecting all devices:



For all the IOT devices we need to connect with the remote IOT server as below details.

IoT Server

☐ None

☐ Home Gateway

☒ Remote Server

Server Address

24.0.0.1

User Name

harsh

Password

harsh

Refresh

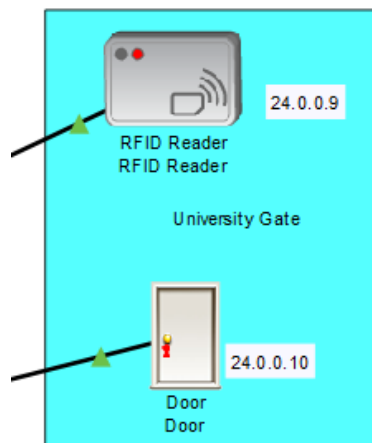
Then we need to configure the conditions that lets see:

First we add the entry pass based on RFID card if the user has a valid RFID card then only door will be open otherwise the door of collage will be closed.

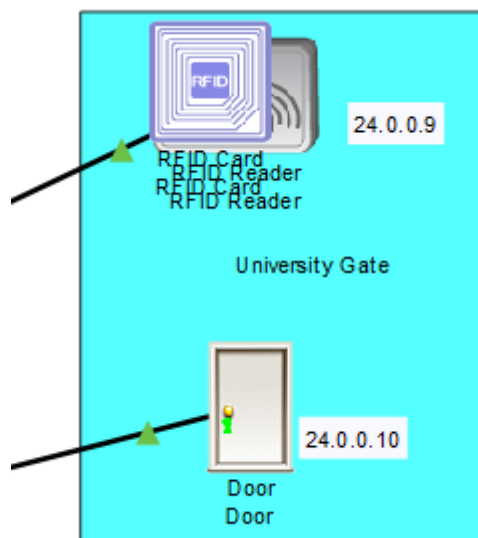
We need to add conditions for it and then need to connect to remote server in RFID card.

Edit	Remove	Yes	RFID Valid	RFID Reader Card ID = 1001	Set RFID Reader Status to Valid
Edit	Remove	Yes	RFID Invalid	RFID Reader Card ID != 1001	Set RFID Reader Status to Invalid
Edit	Remove	Yes	Door Open	RFID Reader Status is Valid	Set Door Lock to Unlock
Edit	Remove	Yes	Door Close	RFID Reader Status is Invalid	Set Door Lock to Lock

Closed door:



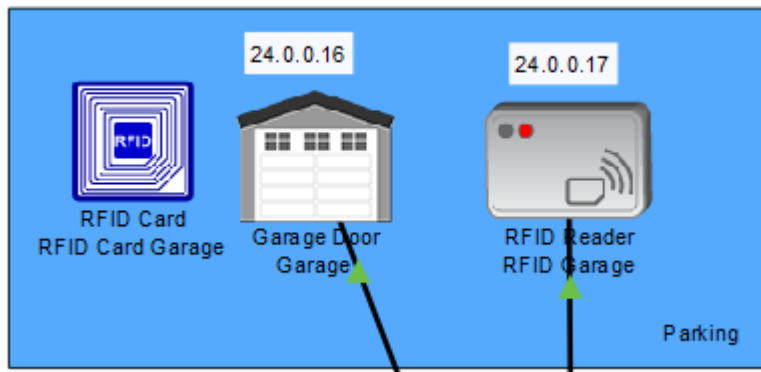
Opened door:



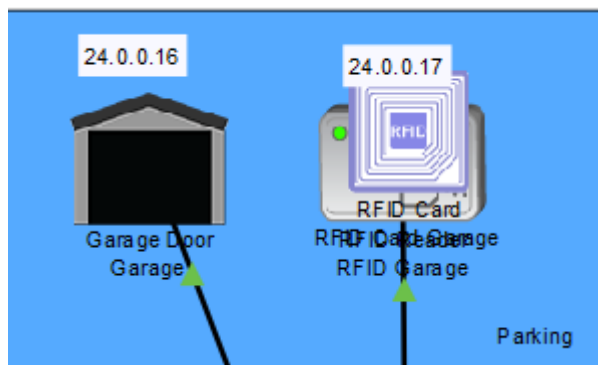
Then we will be also configure the garage door based on RFID for parking.

Edit	Remove	Yes	RFID Garage Valid	RFID Garage Card ID = 1001	Set RFID Garage Status to Valid
Edit	Remove	Yes	RFID Garage Invalid	RFID Garage Card ID != 1001	Set RFID Garage Status to Invalid
Edit	Remove	Yes	Garage Open	RFID Garage Status is Valid	Set Garage On to true
Edit	Remove	Yes	Garage Close	RFID Garage Status is Invalid	Set Garage On to false

Closed garage:



Opened garage:

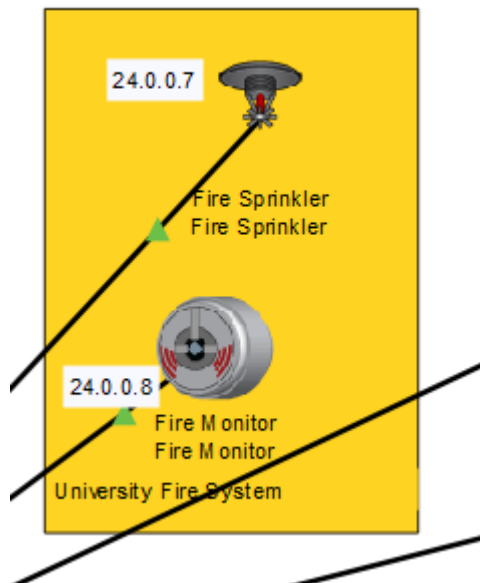


Now for make a fire system we will be use fire sprinkler for water and fire monitor. We will connect each to switch and then configure and if fire will be exists then it will throw the water.

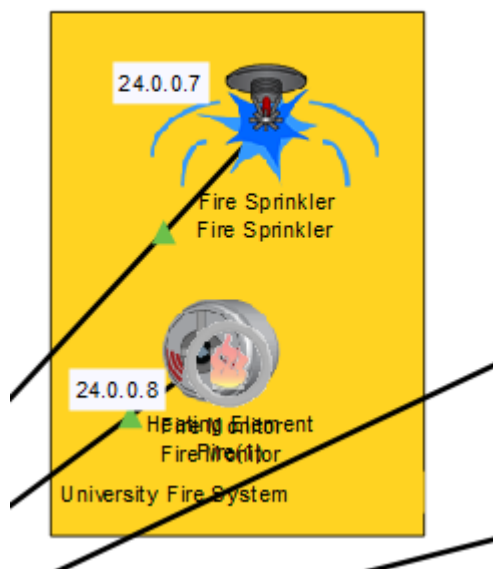
If fire exists then fire sprinkler will be started.

Edit	Remove	Yes	Fire Start	Fire Monitor Fire Detected is true	Set Fire Sprinkler Status to true
Edit	Remove	Yes	Fire Off	Fire Monitor Fire Detected is false	Set Fire Sprinkler Status to false

Normal sprinkler:



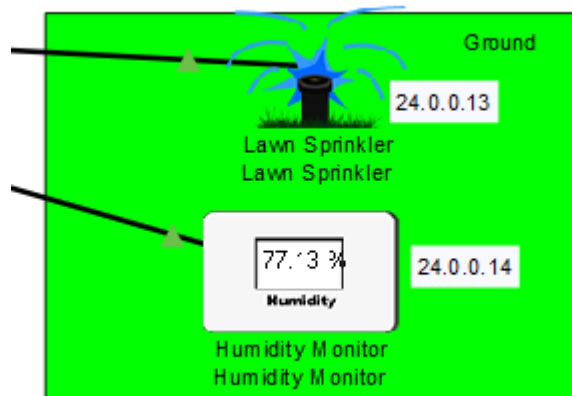
Fire situation:



For garden we will be add humidity and lawn sprinkler if humidity is very low then throw the water to the grass.

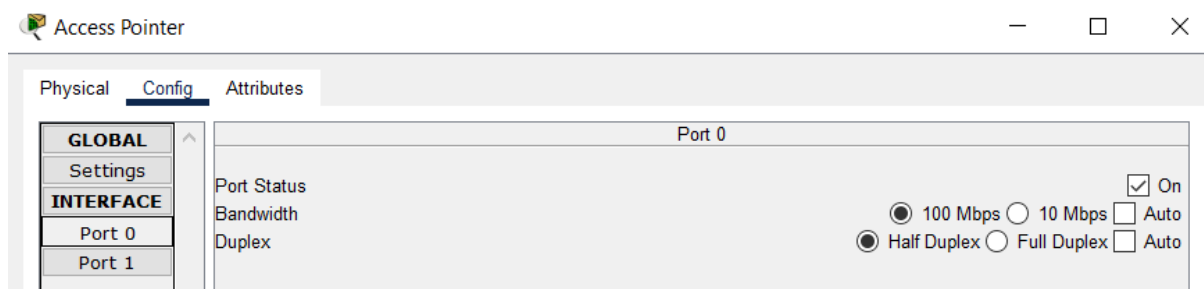
Edit	Remove	Yes	Start Lawn Sprinkler	Humidity Monitor Humidity <= 80 %	Set Lawn Sprinkler Status to true
Edit	Remove	Yes	Off Lawn Sprinkler	Humidity Monitor Humidity > 80 %	Set Lawn Sprinkler Status to false

Here humidity monitor will be show the humidity.

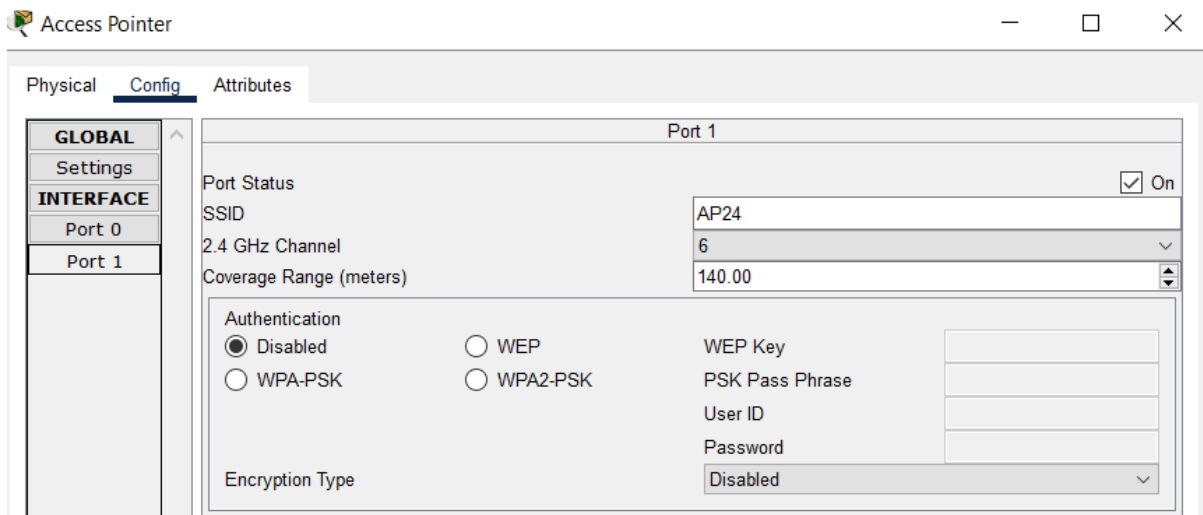


Now we will connect the access point for each class that all the devices inside the class can direct connect to that access point without wires.

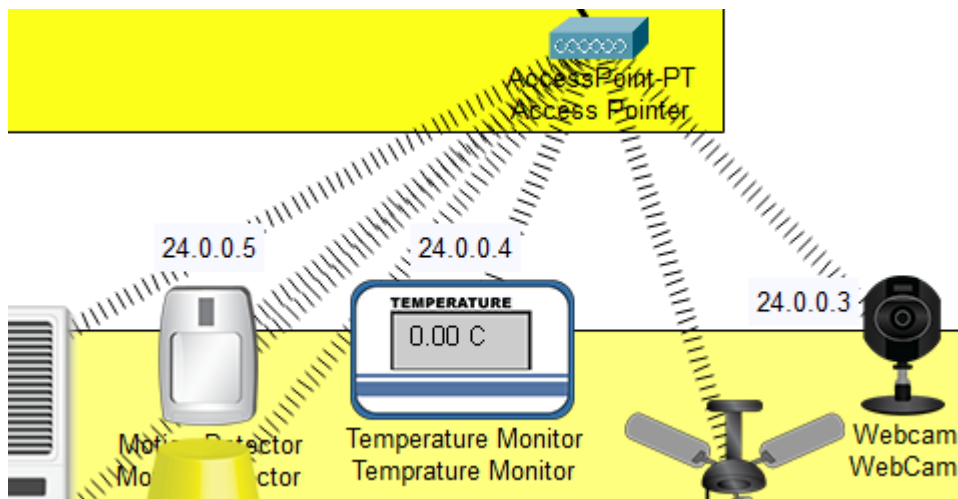
First we will start port 0.



Then we will be assign SSID to that port 1.



First we will be connect the webcam and motion sensor in the class with access point.



We will be connect to IOT server to the server via remote. And also we will be assign ip address and insert SSID to connect with the access point.

WebCam

Specifications
Physical
**Config**
Attributes

GLOBAL
Settings
Algorithm Settings
Files
INTERFACE
Wireless0
Bluetooth

Wireless0

Port Status

☒
On

Bandwidth

24 Mbps

MAC Address

0001.C777.247A

SSID

AP24

Authentication

☒ Disabled
☐ WEP

☐ WPA-PSK
☐ WPA2-PSK

☐ WPA
☐ WPA2

☐ 802.1X
Method:

WEP Key

PSK Pass Phrase

User ID

Password

MD5

User Name

Password

Encryption Type

Disabled

IP Configuration

☐ DHCP
☒ Static

IPv4 Address

24.0.0.3

Subnet Mask

255.0.0.0

IPv6 Configuration

☒ Automatic
☐ Static

IPv6 Address

Link Local Address:

FE80::201:C7FF:FE77:247A

IoT Server

☐ None
☐ Home Gateway
☒ Remote Server

Server Address

24.0.0.1

User Name

harsh

Password

harsh

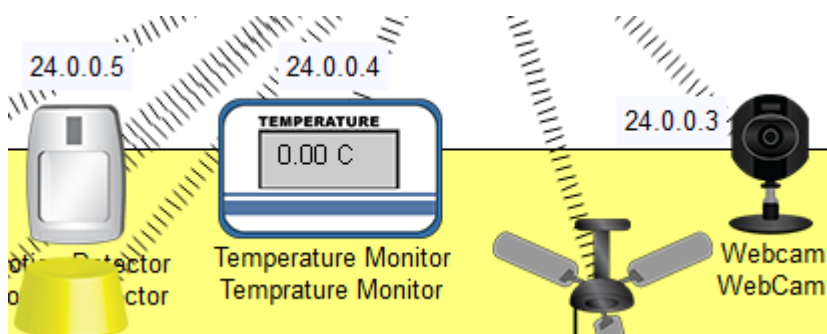
Refresh

We will be setup conditions in server.

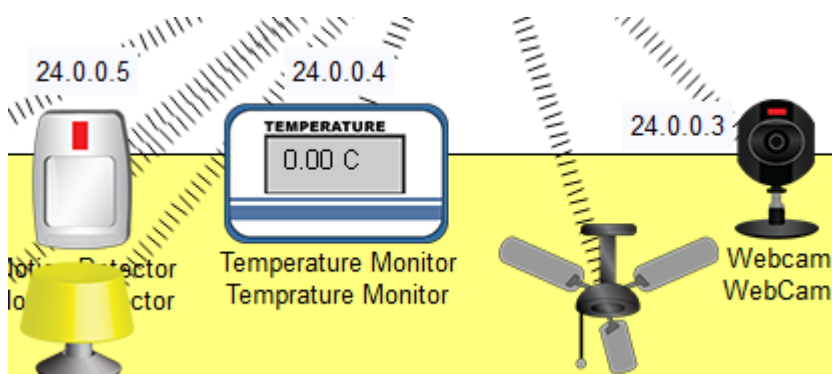
Edit	Remove	Yes	WebCam Start	Motion Detector On is true	Set WebCam On to true
Edit	Remove	Yes	WebCam Off	Motion Detector On is false	Set WebCam On to false



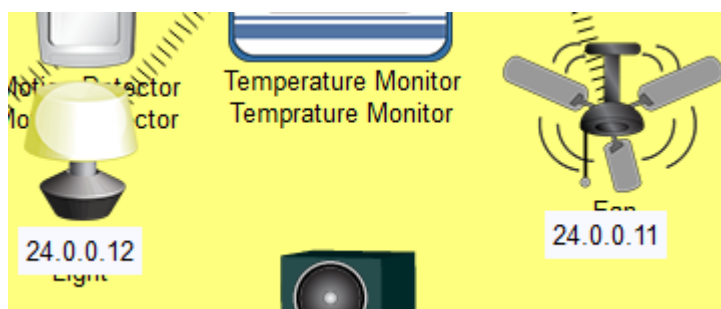
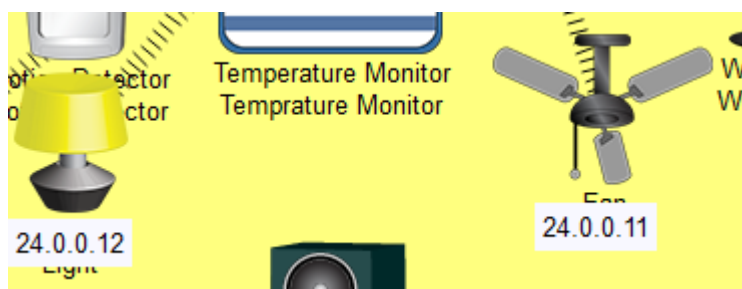
Normal setup:



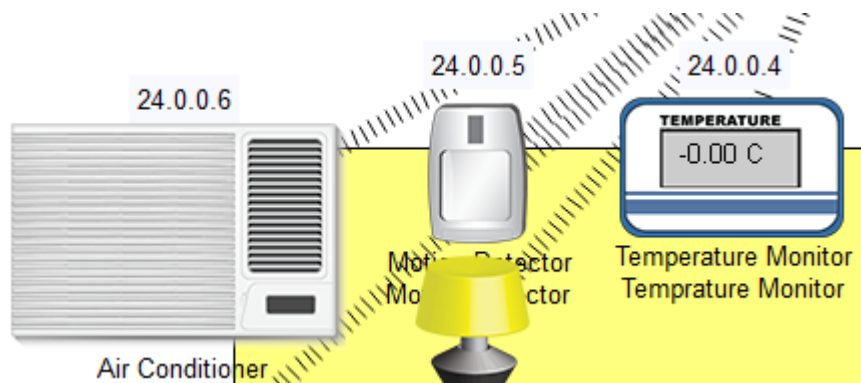
Motion detect setup:



Then we will be connect fan and light also with the access point and can start and turned off from server.



Then we will be connect A.C. and temperature monitor to the access point that if temperature is greater than some amount then start A.C. automatically.



We will connect as same we have done previous with SSID.

AC

Specifications Physical **Config** Attributes

**GLOBAL**

- Settings
- Algorithm Settings
- Files

**INTERFACE**

- Wireless0**
- Bluetooth

Wireless0

Port Status ☒ On

Bandwidth 24 Mbps

MAC Address 00D0.BA20.B7DD

SSID AP24

Authentication

- ☒ Disabled
- ☐ WPA-PSK
- ☐ WPA
- ☐ 802.1X
- ☐ WEP
- ☐ WPA2-PSK
- ☐ WPA2

WEK Key

PSK Pass Phrase

User ID

Password

Method: MD5

User Name

Password

Encryption Type Disabled

IP Configuration

- ☐ DHCP
- ☒ Static

IPv4 Address 24.0.0.6

Subnet Mask 255.0.0.0

IPv6 Configuration

- ☒ Automatic
- ☐ Static

IPv6 Address

Link Local Address FE80::2D0:BAFF:FE20:B7DD

IoT Server

- ☐ None
- ☐ Home Gateway
- ☒ Remote Server

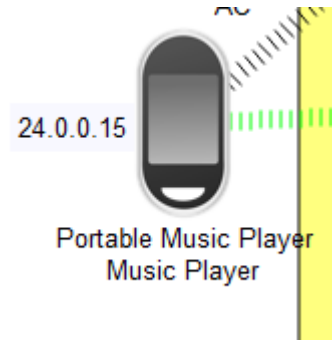
Server Address 24.0.0.1

User Name harsh

Password harsh

Refresh

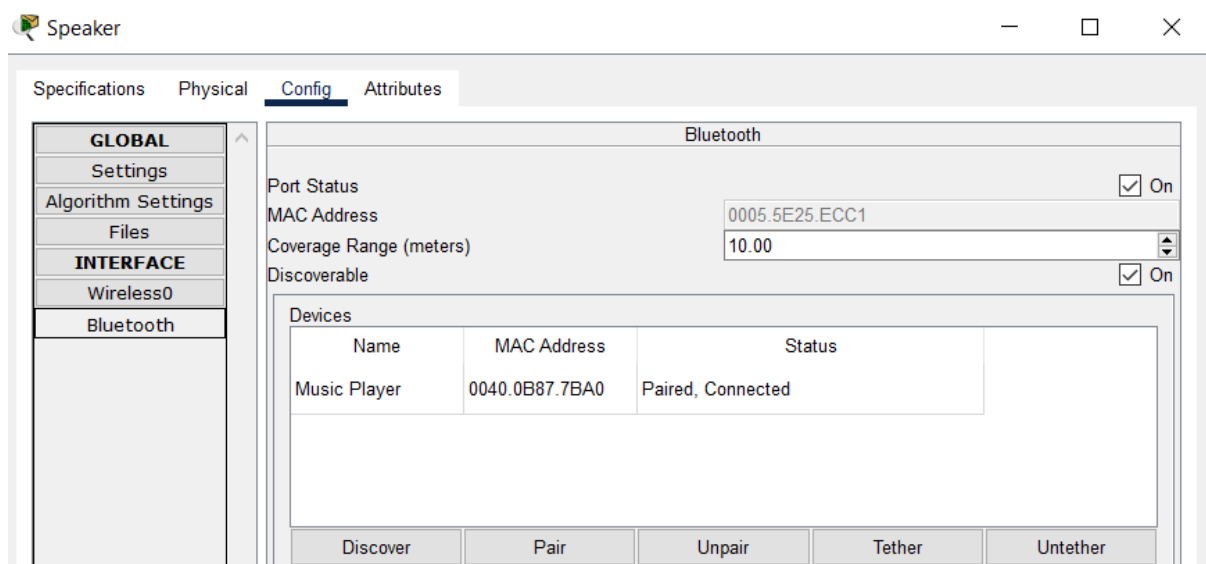
Then we will be connect the portable music player to access point via SSID AP24 to play music.

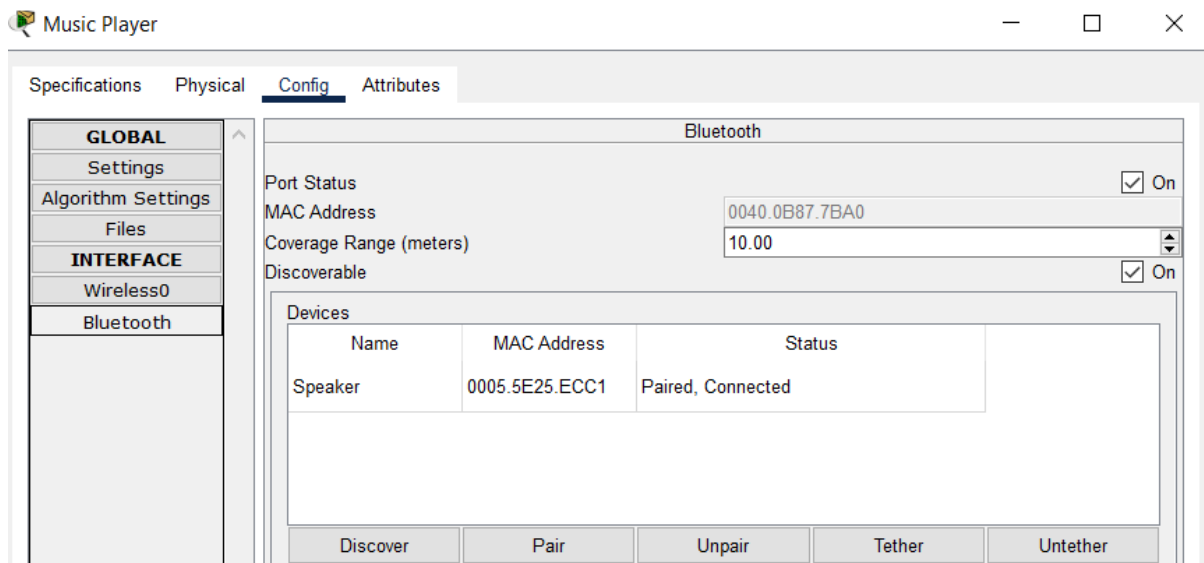


After connecting the music player with access point we will be connect Bluetooth speaker with it via Bluetooth.

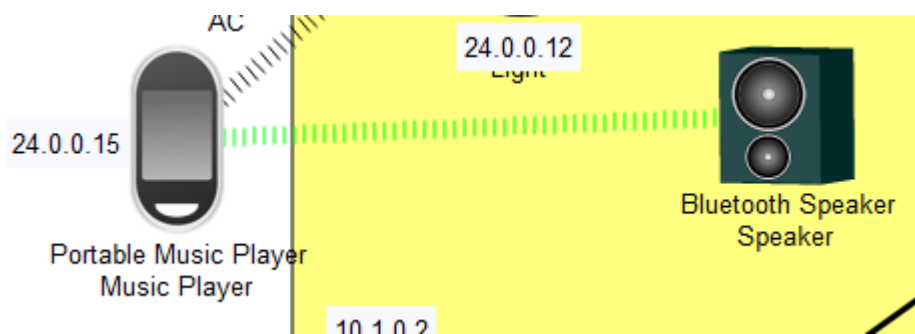


Inside the Bluetooth player we will be start Bluetooth and pair with the portable music player.

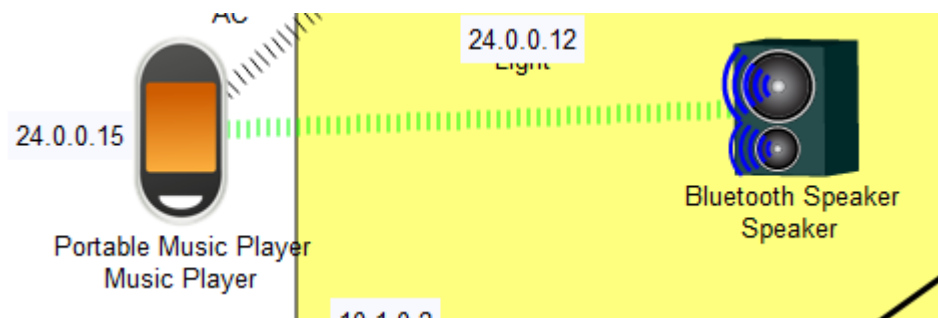




After connecting the Bluetooth:

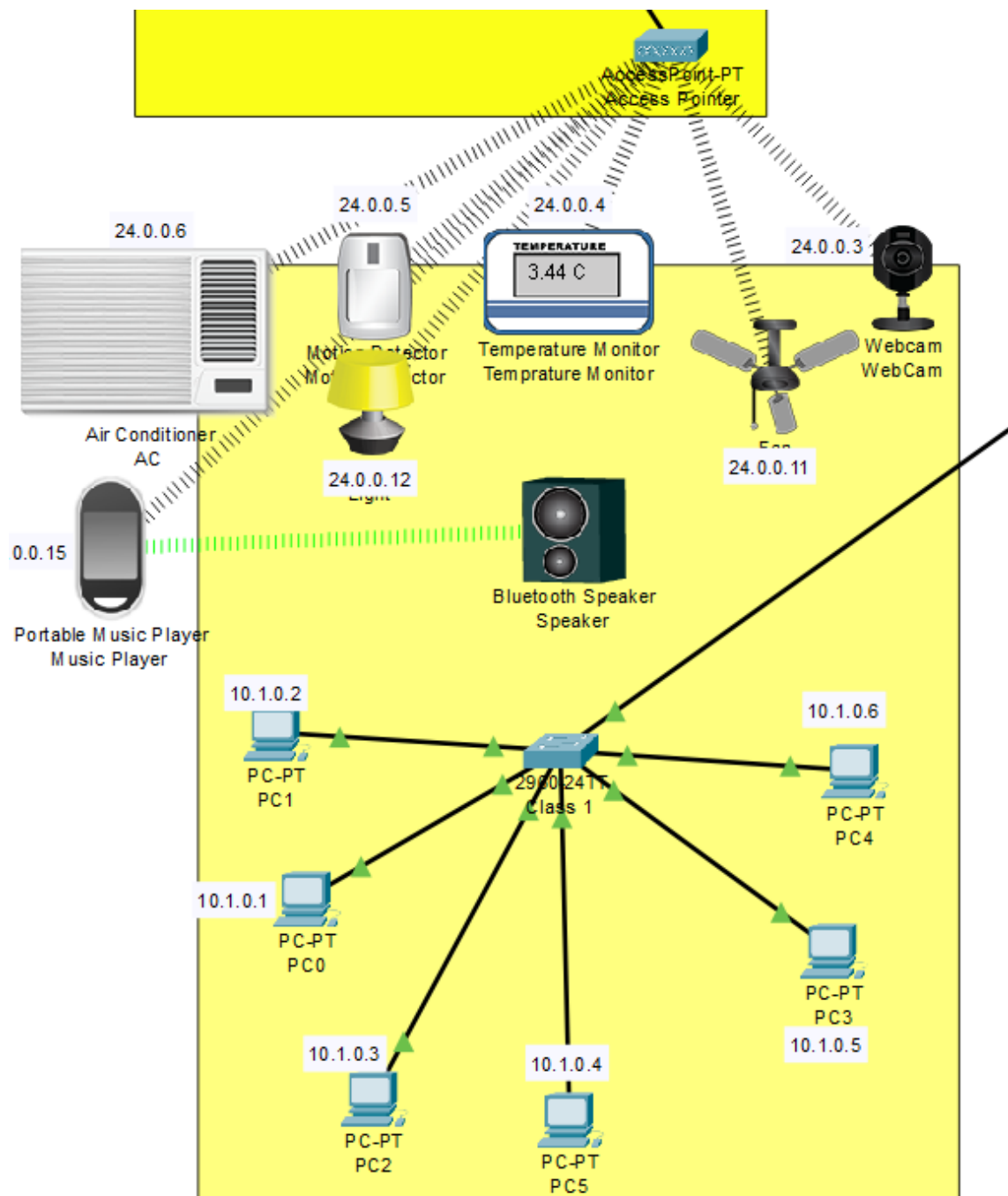


Then when we start portable music player:

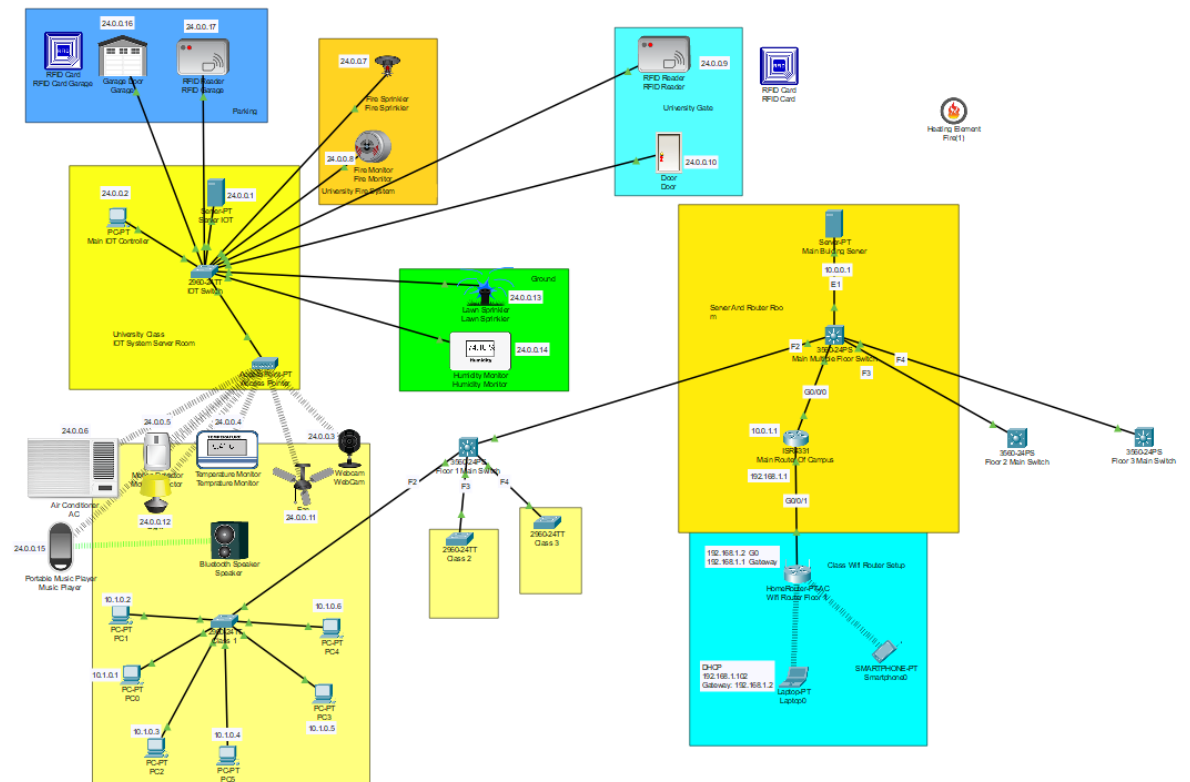


We will be see that speaker will be started.

Whole class connection will be look like:



Whole university campus network will be:



Each box will be show the details inside it.